REMARKS

Applicant is in receipt of the Office Action mailed April 20, 2006. Claims 1-4, 6-24, 26-30, 32-40, 42-46, 48-54, 57-62, and 66-81 were rejected and remain pending in the application. Reconsideration of the case is earnestly requested in light of the following remarks.

Section 112 Rejections and Objections to Drawings

Claims 1-4, 6-24, 26-30, 32-40, 42-44, 53-54, 57-62, 66-79 and 81 were rejected under 35 U.S.C. 112, first paragraph. The Examiner stated that,

> "Claims 1, 30, 36, 37, 43, 44, 53 and 61 recite the limitations regarding acquiring measurement data of a device under test based on an electrical signal from a sensor device coupled to the device under test. The specification does not support electrical signals from sensor devices used in conjunction with a measurement operation."

Although Applicant respectfully submits that the claim limitations to which the Examiner refers are inherently supported in the specification, Applicant believes that the subject matter of claims 1, 30, 36, 37, 43, 44, 53 and 61 is adequately recited without the limitation, "based on an electrical signal from a sensor device coupled to the device under test." Applicant has thus amended these claims to remove this limitation. Applicant respectfully submits that the claim amendments render the Section 112 rejections and the objections to the drawings moot.

Section 102(e) Rejection

Claims 53, 54, and 57-60 were rejected under 35 U.S.C. 102(e) as being anticipated by Blowers et al., U.S. Patent No. 6,298,474 (hereinafter "Blowers"). Applicant respectfully traverses this rejection.

Claim 53 recites in pertinent part, "wherein at least one of the DAQ operations included in the sequence is operable to control a DAQ measurement device to acquire measurement data of a device under test." The Examiner has interpreted the "DAQ measurement device" recited in claim 53 as a camera. As argued in detail below, Applicant respectfully submits that this interpretation is erroneous and is not how those

skilled in the art would interpret the term "DAQ measurement device" in light of the specification.

Furthermore, even if the DAQ measurement device is interpreted as a camera, Blowers still does not teach these claim limitations. The Examiner has interpreted the Caliper tool operation taught by Blowers as a DAQ operation. With respect to the above-recited claim limitations, the Examiner states on p. 18 of the current Office Action that,

> "This is clearly shown by Blowers starting Col. 11, line 65. Blowers also teaches the Caliper tool 63, which finds edges used to calculate measurements which can be seen as a DAQ operation. The input images are acquired from the DAQ device, or camera, and then the measurement application takes measurements during image analysis."

However, as noted above, claim 53 recites, "wherein at least one of the DAQ operations included in the sequence is operable to control a DAQ measurement device to acquire measurement data of a device under test." The Caliper tool detects features in an image that has been acquired by the camera (Col. 9, lines 44-52), but the Caliper tool is not operable to control the camera (which the Examiner has interpreted as the DAQ measurement device), as recited in claim 53. In particular, the Caliper tool is not operable to control the camera to acquire measurement data of a device under test. Thus, Applicant submits that Blowers clearly does not teach the above-recited limitations of claim 53, and thus, claim 53 is patentably distinct over Blowers for at least this reason.

Furthermore, Applicant respectfully submits that the Examiner's interpretation of a DAQ measurement device as a camera is erroneous. The Examiner states that, "Data Acquisition is a broad term and is taught by the prior art." However, Applicant reminds the Examiner that claims must be given the broadest reasonable interpretation consistent with the specification. The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. (See MPEP 2111). Appellant respectfully submits that the Examiner's interpretation of a DAQ measurement device as a camera is not consistent with the specification and would not be interpreted as such by those skilled in the art, in light of the specification.

Applicant first notes that the specification explicitly discloses both a camera and a DAQ measurement device and describes them in such a way that it is clear that a DAQ measurement device refers to something other than a camera. For example, Figures 2A

and 2B illustrate both a plug-in DAQ board 114 and a camera 132. The specification describes that: .

> The host computer 82 may also be coupled to a data acquisition (DAQ) board 114, which may interface through signal conditioning circuitry 124 to the UUT. In one embodiment, the signal conditioning circuitry 124 may comprise an SCXI (Signal Conditioning eXtensions for Instrumentation) chassis comprising one or more SCXI modules 126. The sequence developed in the prototyping environment described herein may include one or more DAQ operations. Thus, when the host computer 82 executes the sequence, the DAQ operations may control the DAQ board 114, e.g., to cause the DAQ board 114 to acquire data from the UUT.
>
> Similarly, the sequence may include one or more machine vision operations which cause the host computer 82 to acquire images via the video device or camera 132 and associated image acquisition (or machine vision) card 134. *(p. 17, lines 1-11)*

In light of this description, it is clear that a DAQ measurement device and a camera refer to two different kinds of devices. Thus, Applicant respectfully submits that the Examiner's interpretation of a DAQ measurement device as a camera is not consistent with the specification.

Furthermore, throughout the entire specification, reference is made to three different types of operations: motion control operations, machine vision operations, and data acquisition (DAQ) operations. The specification describes that:

> Any of various types of machine vision or image analysis operations may also be provided. Exemplary functions related to machine vision and image analysis include:
> · filtering functions for smoothing, edge detection, convolution, etc.
> · morphology functions for modifying the shape of objects in an image, including erosion, dilation, opening, closing, etc.
> · thresholding functions for selecting ranges of pixel values in grayscale and color images
> · particle filtering functions to filter objects based on shape measurements
> · a histogram function that counts the total number of pixels in each grayscale value and graphs it
> · a line profile function that returns the grayscale values of the pixels along a line drawn through the image with a line tool and graphs the values
> · particle analysis functions that computes such measurements on objects in an image as their areas and perimeters

- a 3D view function that displays an image using an isometric view in which each pixel from the image source is represented as a column of pixels in the 3D view, where the pixel value corresponds to the altitude.
- an edge detection function that finds edges along a line drawn through the image with a line tool
- a pattern matching function that locates regions of a grayscale image that match a predetermined template
- a shape matching function that searches for the presence of a shape in a binary image and specifies the location of each matching shape
- a caliper function that computes measurements such as distances, areas, and angles based on results returned from other image processing functions
- a color matching function that quantifies which colors and how much of each color exist in a region of an image and uses this information to check if another image contains the same colors in the same ratio (*p. 22, line 9 – p. 23, line 5*)

Thus, the specification discloses machine vision operations, including "filtering functions for smoothing, edge detection, convolution, etc." and "an edge detection function that finds edges along a line drawn through the image with a line tool" and "a caliper function that computes measurements such as distances, areas, and angles based on results returned from other image processing functions." Applicant notes that these machine vision operations perform functions very similar to Blowers' Caliper tool. Blowers describes that, "The caliper tool 63 is used to locate pairs of edges within an inspection image. A Region Of Interest (ROI) defines the area to be searched within the image and also the orientation of the edge pairs. The caliper tool 63 is typically used to measure component width by finding edges with sharp contrast changes. The caliper tool 63 generates pass/fail results based on its ability to find edge pairs that are within the specified image." (Col. 9, lines 44-52).

In contrast, the specification describes DAQ operations as follows:

> Any of various types of DAQ operations may also be provided. For example, the DAQ operations may include operations related to digital I/O, analog input, analog output, signal conditioning, calibration and configuration (e.g., to calibrate and configure specific devices), counting operations, etc. (*p. 22, lines 5-8)*

Applicant notes that claim 53 recites, "wherein the plurality of operations included in the sequence includes at least one machine vision operation and at least one DAQ operation". In light of the specification, which clearly describes machine vision

operations that are very similar to Blowers' Caliper tool, those skilled in the art would interpret Blower's Caliper tool not as a DAQ operation, but as a machine vision operation. Applicant respectfully submits that the Examiner has attempted to reconstruct Applicant's invention by picking and choosing various elements from Blowers and interpreting them in ways that are clearly not consistent with the spirit of Applicant's specification.

Applicant also notes that Blowers nowhere teaches the use of DAQ operations or a DAQ measurement device, and in fact, the terms "DAQ" and "Data Acquisition" are entirely absent from Blowers' disclosure. Also, FIGS. 2 and 3 show several devices in Blowers' machine vision system, but they do not show a DAQ measurement device. Blowers is directed toward developing software for machine vision applications. DAQ measurement devices are typically used in test and measurement applications, e.g., to acquire measurement data of a device under test. Applicant can find no teaching in Blowers regarding the development of software to perform a measurement application involving measurement data received from a DAQ measurement device. Blowers' machine vision system operates on input images acquired by cameras such as shown in FIG. 2, not on measurement data acquired from a DAQ measurement device.

Thus, for at least the reasons set forth above, Applicant respectfully submits that Blowers does not teach the limitations of "wherein the plurality of operations included in the sequence includes at least one machine vision operation and at least one DAQ operation, wherein at least one of the DAQ operations included in the sequence is operable to control a DAQ measurement device to acquire measurement data of a device under test," and thus claim 53, and the claims dependent thereon, are patentably distinct over Blowers.

Furthermore, Applicant respectfully submits that numerous of the claims dependent on claim 53 recite additional limitations that are not taught or suggested by Blowers. For example, claim 58 recites the additional limitations of, "wherein the prototype is operable to: control an image acquisition device to acquire one or more images of the device under test; and control the DAQ measurement device to acquire the measurement data of the device under test." The Office Action cites Col. 11, line 65 et seq. as teaching these features. However, this portion of Blowers teaches measuring

visual features in an acquired image. Measuring visual features in an acquired image of an object is not the same as controlling a DAQ measurement device to acquire measurement data of a device under test, as recited in claim 58. Blowers does not teach acquiring one or more images of a device under test and controlling a DAQ measurement device to acquire measurement data of the same device under test. Furthermore, the one or more images in claim 58 are acquired by an image acquisition device, and the measurement data is acquired by a DAQ measurement device. Blowers does not teach the use of two different devices, where one is an image acquisition device to acquire images of a device under test and the other is a DAQ measurement device to acquire measurement data of the device under test.

Applicant notes that this argument with respect to claim 58 was presented in response to the previous Office Action, but the Examiner did not respond to the argument. Applicant respectfully requests the Examiner to respond to Applicant's arguments in order to expedite prosecution of the patent application.

As another example, claim 60 recites the additional limitations of, "automatically generating a graphical program based on the sequence of operations, wherein the graphical program is executable to perform the sequence of operations, wherein the graphical program comprises a plurality of interconnected nodes that visually indicate functionality of the graphical program, wherein automatically generating the graphical program comprises automatically including the plurality of interconnected nodes in the graphical program without user input specifying the nodes." The Office Action refers to the tree structure such as shown in FIG. 7 of Blowers. However, this tree structure is not automatically generated. On the contrary, the icons are included in the tree structure in response to user input selecting the icons (Col. 8, lines 61 – 67). Blowers does not teach the concept of automatically generating a graphical program, wherein automatically generating the graphical program comprises automatically including a plurality of interconnected nodes in the graphical program without user input specifying the nodes.

Applicant notes that this argument with respect to claim 60 was presented in response to the previous Office Action, but the Examiner did not respond to the argument. Applicant respectfully requests the Examiner to respond to Applicant's arguments in order to expedite prosecution of the patent application.

Section 103(a) Rejections

Claims 1-4, 6-20, 24, 26-30, 32-40, 42-46, 48-52, 61-62, 66-69, 71-73, 76 and 78 were rejected under 35 U.S.C. 103(a) as being unpatentable over Blowers et al., U.S. Patent No. 6,298,474 (hereinafter "Blowers") in view of Weinhofer, U.S. Patent No. 6,442,442 (hereinafter "Weinhofer"). Applicant respectfully traverses these rejections.

As per claims 1-44 and 61-68, the independent claims recite similar limitations regarding DAQ operations as discussed above with respect to claim 53. For example, claim 1 recites as follows:

> 1. (Currently Amended) A computer-implemented method for creating a prototype that includes motion control, machine vision, and Data Acquisition (DAQ) functionality, the method comprising:
>
> displaying a graphical user interface (GUI) that provides GUI access to a set of operations, wherein the set of operations includes one or more motion control operations, one or more machine vision operations, and one or more DAQ operations;
>
> creating a sequence of operations, wherein creating the sequence comprises including a plurality of operations in the sequence in response to user input selecting each operation in the plurality of operations from the GUI, wherein including the plurality of operations in the sequence in response to the user input selecting each operation in the plurality of operations from the GUI comprises including the plurality of operations in the sequence without receiving user input specifying program code for performing the plurality of operations;
>
> wherein the plurality of operations included in the sequence includes at least one motion control operation, at least one machine vision operation, and at least one DAQ operation, wherein at least one of the DAQ operations included in the sequence is operable to control a DAQ measurement device to acquire measurement data of a device under test;
>
> wherein the method further comprises storing information representing the sequence of operations in a data structure, wherein the sequence of operations comprises the prototype.

The Office Action states that Blowers teaches the limitations regarding DAQ operations. However, Applicant respectfully disagrees, for reasons similar to those discussed above with respect to claim 53. Applicant thus submits that Blowers and Weinhofer, taken either singly or in combination, do not teach all the limitations of claims 1-44 and 61-68, and thus, these claims are allowable for at least this reason.

Applicant also submits that Weinhofer does not teach including at least one motion control operation in a sequence without receiving user input specifying program code for performing the motion control operation. Weinhofer teaches that the user creates a graphical data flow program that comprises a plurality of interconnected icons, where connections between the icons represent data flow between the icons (Col. 3, line 63 – Col. 4, line 7; and Col. 6, lines 5 – 38). The icons and the connections between the icons constitute graphical program code that defines the functionality of the graphical program. Weinhofer does not teach including motion control operations in a sequence in response to user input, but without receiving user input specifying program code for performing the motion control operations. Applicant notes that this argument was presented in response to the previous Office Action, but the Examiner did not respond to the argument. Applicant respectfully requests the Examiner to respond to Applicant's arguments in order to expedite prosecution of the patent application.

Furthermore, Applicant submits that a *prima facie* case of obviousness has not been established for claims 1-52 and 61-68. In particular, Applicant respectfully submits that there is no evidence of any teaching, suggestion, or motivation to combine Blowers and Weinhofer. As held by the U.S. Court of Appeals for the Federal Circuit in *Ecolochem Inc. v. Southern California Edison Co.*, an obviousness claim that lacks evidence of a suggestion or motivation for one of skill in the art to combine prior art references to produce the claimed invention is defective as hindsight analysis. Furthermore, the showing of a suggestion, teaching, or motivation to combine prior teachings "must be clear and particular. . .Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence'." *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999) (Emphasis added).

The Examiner asserts that, "One would have been motivated to make such a combination because an all-purpose graphical automotive controller would have been obtained, as taught by Weinhofer." As Applicant has pointed out in the responses to the previous two Office Actions, Applicant can find no teaching in Weinhofer of this alleged "all-purpose graphical automotive controller." Applicant again, for the third time, respectfully requests the Examiner to cite where Weinhofer teaches this "all-purpose graphical automotive controller". Furthermore, Applicant respectfully submits that

teaching an "all-purpose graphical automotive controller" would not amount to a clear and particular teaching or suggestion for combining Blowers with Weinhofer, as required to form a *prima facie* case of obviousness.

Applicant submits that neither Weinhofer nor Blowers contain any clear teaching or suggestion for combining the two references. Blowers is directed toward developing software for machine vision applications. Weinhofer is directed toward developing software for motion control applications. Applicant can find no teaching in Blowers regarding the development of software to perform an application involving motion control as taught in Weinhofer. Similarly, Applicant can find no teaching in Weinhofer regarding the development of software to perform an application involving machine vision as taught in Blowers. Thus, there would be no motivation for incorporating the machine vision operations taught in Blowers into Weinhofer's system or for incorporating the motion control operations taught in Weinhofer into Blowers's system.

In response to Applicant's arguments that there is no clear teaching or suggestion for combining Blowers and Weinhofer, the Examiner asserts that, "In this case, Weinhofer explains how motion controllers are part of many industrial control systems including programmable controller systems (Col. 1, line 48). Blowers teaches a programmable controller system." However, the cited portion of Weinhofer states that, "Motion controllers may for example be provided in the form of modules for a programmable controller system or as PC-based expansion cards or stand-alone units that communicate with the programmable controller system via a network communication link." Applicant submits that this simply describes a motion control system architecture in which motion controllers are provided in the form of modules for a programmable controller system. This says nothing about performing a machine vision application such as taught in Blowers and does not amount to a clear and particular teaching or suggestion for combining Weinhofer with Blowers. Applicant notes that this was pointed out in response to the previous Office Action, but the Examiner did not respond to the argument. Applicant respectfully requests the Examiner to respond to Applicant's arguments in order to expedite prosecution of the patent application.

In response to Applicant's arguments, the Examiner also cites Col. 2, line 57 – Col. 3, line 25, where Weinhofer describes that existing programming interfaces do not

enable the relationship between various motion control axes to be readily ascertained. To solve this problem, Weinhofer teaches at Col. 4, lines 8-20 that:

> Advantageously, the programming interface according to the preferred embodiment of the invention explicitly indicates the physical relationship between the various motion control axes. The various motion control axes are represented by icons, and the icons are connected with connection lines that represent data flow between the motion control axes. Additional icons are provided that show relationships such as gearing, position cams, time cams, and so on. The programming interface is thus organized based on the physical relationship between the axes, and the physical relationships for the entire system are displayed to the user in a single workspace, without the user having to click on numerous icons. (*Emphasis added*)

Blowers teaches at Col. 2, lines 47-53 that:

> An object of the present invention is to provide a method and system for interactively developing application software for use in a machine vision system and computer-readable storage medium having a program for executing the method wherein the user teaches an imaging programming task without writing any code. Consequently, the user need not be a programmer. (*Emphasis added*)

Thus, Blowers emphasizes that the user is able to develop application software for use in a machine vision system without writing any code, and thus, the user need not be a programmer. In contrast, Weinhofer teaches that the user creates a program that comprises a plurality of interconnected icons (Col. 3, line 63 – Col. 4, line 7; and Col. 6, lines 5 – 38). In creating the program, the user is necessarily a programmer, and the user necessarily writes program code for the program, where the program code is in the form of icons and data flow lines connecting the icons.

One would not be motivated to combine Weinhofer with Blowers because Weinhofer emphasizes the importance of the interconnected icons in the graphical data flow program, since the icons indicate the physical relationship between the various motion control axes, and also show relationships such as gearing, position cams, time cams, etc. Creating a graphical data flow program by specifying graphical code comprising icons and nodes is an important aspect of Weinhofer's teaching, since the interconnected icons in the graphical data flow program illustrates the physical relationship between the various motion control axes. Thus, Weinhofer actually teaches away from any combination with Blowers, since Blowers teaches developing application

software for a machine vision system without the user being a programmer and without the user writing program code. Applicant notes that this argument was presented in response to the previous Office Action, but the Examiner did not respond to the argument. Applicant respectfully requests the Examiner to respond to Applicant's arguments in order to expedite prosecution of the patent application.

Applicant thus respectfully submits that claims 1-52 and 61-68 are allowable over the cited references for at least the reasons set forth above. Furthermore, Applicant respectfully submits that numerous ones of the dependent claims recite additional limitations that are not taught by either of the references, taken either singly or in combination.

For example, claim 29 recites as follows:

> 29. (Previously Presented) The method of claim 1, further comprising:
> automatically converting the sequence of operations to a hardware configuration format usable for configuring configurable hardware of an embedded device to perform the sequence of operations; and
> configuring the configurable hardware of the embedded device to perform the sequence of operations using the hardware configuration format.

Neither reference teaches automatically converting a sequence of operations to a hardware configuration format usable for configuring configurable hardware of an embedded device to perform the sequence of operations.

Applicant also respectfully submits that numerous ones of the dependent claims other than those specifically discussed above recite further distinctions over the cited references. However, since the independent claims have been shown to be patentably distinct, a further discussion of the dependent claims is not necessary at this time.

Claims 21-23, 70, 74-75, 77, and 79-81 were rejected under 35 U.S.C. §103(a) as being unpatentable over Blowers, Weinhofer, and Wolfson. Applicant respectfully traverses these rejections.

Applicant reminds the Examiner that if an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Applicant thus respectfully submits that since the independent claims have been shown above to be patentably distinct and non-

obvious over the prior art, these dependent claims are also patentably distinct and non-obvious, for at least this reason.

Applicant also submits that Wolfson does not teach the limitations recited in claims 21-23, 70, 74-75, 77, and 79-81, either singly or in combination with the other references. However, since the independent claims have been shown to be patentably distinct, a further discussion of these dependent claims is not necessary at this time.

CONCLUSION

Applicant submits the application is in condition for allowance, and an early notice to that effect is requested.

If any extensions of time (under 37 C.F.R. § 1.136) are necessary to prevent the above referenced application(s) from becoming abandoned, Applicant(s) hereby petition for such extensions. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert & Goetzel PC Deposit Account No. 50-1505/5150-58200/JCH.

Also enclosed herewith are the following items:

☒ Return Receipt Postcard

Respectfully submitted,

Mark S. Williams
Reg. No. 50,658
Agent for Applicants

Meyertons, Hood, Kivlin, Kowert & Goetzel PC
P.O. Box 398
Austin, TX 78767-0398
Phone: (512) 853-8800
Date: July 20, 2006 JCH/JLB